

A COMPARISON OF DIFFERENT WELL TYPES AND THEIR APPLICATIONS

WELL TYPE	SUITABLE GEOLOGIC MATERIALS	ADVANTAGES	DISADVANTAGES
DUG WELLS	OVERBURDEN both low and high yielding materials (gravel, sand, silt, clay)	• Does not require special machinery to construct • Large diameter provides reasonable storage, augments low yields • Can be constructed in areas of limited access	• Labour intensive to construct • Depth is limited because of caving • Well failure is common during dry periods because of poorly drilled depths
BORED WELLS	OVERBURDEN both low and high yielding materials (gravel, sand, silt, clay)	• Efficient method of constructing large diameter wells • Large diameter provides reasonable storage, augments low yields • Can reach deeper depths than other techniques • Can penetrate bedrock	• Depth is usually limited by well-drilling equipment limitations and very hard earth materials • Generally small-diameter wells with little reservoir storage capacity
DRILLED WELLS	OVERBURDEN AND BEDROCK moderate to high yielding materials (sand, gravel, sand, stone, limestone)	• Can reach deeper depths than other techniques • Can penetrate bedrock	• Generally small-diameter wells with little reservoir storage capacity
DRIVEN OR SET WELLS (Sand Points)	OVERBURDEN moderate to high yielding materials (sand and gravel)	• Simple installation can be done by hand or machine • A number of these wells can be installed into one water supply system	• Small diameter provides little reservoir storage • Depth is limited by weight of overburden

YIELDS FROM SHALLOW OVERBURDEN - SUMMARY

Shallow overburden wells yield less than two gallons per minute in most areas of the northern portion of the County of Simcoe. Areas of 2 to 5 gallons per minute are found mostly in areas of permeable, surficial sands and gravels of beach, shallow lacustrine, ice-contact and glacio-fluvial origins. Such areas are found along major bodies of water such as Nottawasaga Bay to the west, Thunder Bay to the northwest and Lake Simcoe and along rivers such as Frog Creek and Sturgeon River in the west-central portion of the map area and Coldwater River and Willow Creek in the central portion of the map area. Significant areas yielding 10 to 50 gallons per minute are restricted to raised beach deposits of glacial Lake Algonquin along Nottawasaga Bay in the west. Isolated pockets yielding 10 to 50 gallons per minute and over 50 gallons per minute are scattered in beach, ice-contact, and alluvial sands and gravels in the Midland area and along the west shore of Lake Couchiching.

Areas with insufficient data for yield interpretations are found in the northwest portion of the map area around Wye Lake at Midland, and on Christian, Beckett, Hope and Queen's Town islands. Areas with very thin overburden are found in the northern and eastern portions of the map area.

SOURCES OF INFORMATION

Burweiser, G. J., 1974. Quaternary geology of the Collingwood-Nottawasaga area, southern Ontario. Division of Mines, Preliminary Map P-919, Geological Series.

Burweiser, G. J., and Boyd, S. T., 1974. Quaternary geology of the Or Lake area (western half)-Nottawasaga area (eastern half), southern Ontario. Ontario Division of Mines, Preliminary Map P-975, Geological Series.

Burweiser, G. J., and Cairns, B. D., 1974. Quaternary geology of the Barrie area (western half), southern Ontario. Ontario Division of Mines, Preliminary Map P-978, Geological Series.

Chapman, L. J., and Pulman, D. F., 1975. Physiography of the Georgian Bay-Ottawa Valley area. Ontario Ministry of Natural Resources, Ontario Research Foundation, Map 228.

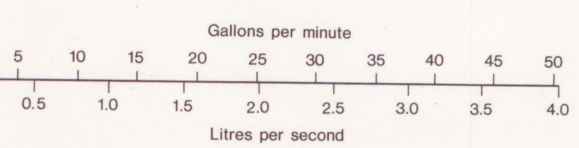
Deane, R. E., 1959. Pleistocene geology of the Lake Simcoe District, Ontario. Geological Survey of Canada, Memoir 254.

Turner, M. E., 1981. Ground-water probability of the southern portion of the County of Simcoe, Ontario. Ministry of Environment, Water Resources Branch, Map 3135.

NOTE:
Geological information was derived from water-well records on file with the Ontario Ministry of Environment up to September, 1979.
Map compilation and interpretation by M. E. Turner, 1980.
Cartography by D. McQuillan.
Base maps derived from 1:50 000 map sheets of the National Topographic series.

METRIC CONVERSIONS

1 foot	= 0.305 metres
1 mile	= 1.609 kilometres
1 gallon	= 4.544 litres
1 gallon per minute	= 7.576 x 10 ⁻³ litres per second



Map 3126-2
PERMEABILITY OF SURFICIAL MATERIALS

Scale 1 : 300 000
1 inch equals approximately 4.73 miles

LEGEND

- 3 Less permeable materials, clay, silt, ill
- 2 Permeable materials, sand and/or gravel
- 1 Bedrock
- 3/1 Bedrock overlain by thin layer of less permeable materials
- Swamp

ASSESSING WATER REQUIREMENTS

In order to evaluate well yields, the amount of water required from a prospective well should first be estimated. To estimate the approximate domestic and livestock daily water requirements, multiply the number of users (people and animals) by the approximate figure in the table below. If desired, an additional 20 to 30% can be added to the total to account for increased demand in the future. While individual residential needs are difficult to estimate, most home water-using items such as washing machines will average about 100 gallons per day per person.

It is important to take into account the water demand during peak periods of usage in order that the well does not run dry temporarily. This demand can be estimated by counting the number of toilets and water closets in the house which will be used at one time, and multiplying by the flow rate for each. Tables showing the flow rate per fixture can be obtained from water-supply equipment dealers.

Approximate Daily Water Requirements

each member of the family (bathing, laundry, bath)	50-150 gallons per day
for each producing milk cow (first milking)	35 gallons per day
for each dry cow	15 gallons per day
for each water horse	12 gallons per day
for each hog	4 gallons per day
for each 100 chickens	2 gallons per day
for each 100 turkeys	6 gallons per day
	12 gallons per day

Note: -table modified from F. B. How, Farm Water Supply, Ontario Department of Agriculture and Food, Publication 473.

For information on irrigation requirements, contact your Regional Office of the Ontario Ministry of Agriculture and Food.

DESCRIPTIVE NOTES

EVALUATION OF PROSPECTIVE WELL SITES

By using the maps in this publication along with the following step-by-step procedure, prospective well sites can be evaluated in terms of probable yields, likely depths to water-bearing zones, and likely quality of water at each site. Subsequently, this information can be used in other considerations such as possible water treatment, control type and size, well cost, and type of well construction (a table illustrating the different types of well construction and their applications is appended).

The maps should be used in the suggested sequence in order to obtain the most accurate results. Map 3126-1 indicates yields from the shallowest formations and should be consulted first. Progressively deeper and more costly wells will have to be constructed as water is sought from deeper formations in order to obtain the yields indicated on maps 3126-3 and 3126-5.

Evaluation Procedure

- locate the well site on Map 3126-1 of Sheet 1 (Yields from Shallow Overburden);
 - note the colour of the map at the well site;
 - refer to the legend and relate the colour to the appropriate probable yield;
 - if the probable yield does not meet your water requirements, repeat steps one through three using Map 3126-2 on Sheet 2 (Yields from Deep Overburden). Similarly, if probable yields determined from Map 3126-3 are insufficient, repeat the same steps using Map 3126-5 on Sheet 3 (Yields from Bedrock).
- To evaluate the depths to water-bearing zones:
- if Map 3126-1 was selected in the above steps, water-bearing zones occur at depths easily reached by shallow dug and bored wells and sand points; if Map 3126-3 was selected, locate the well site on Map 3126-4 and note the depths to the water-bearing zones by using the legend; if Map 3126-5 was selected, locate the well site on Map 3126-6 and note the depths to the water-bearing zones by using the legend;
 - exact depths to water-bearing zones for individual wells are shown on maps 3126-1, 3126-3 and 3126-5.

To evaluate water quality:

- to evaluate the likely ground-water quality at a potential well site, locate the well on the selected yield map and note the nearby ground-water sampling points. Chemical analyses of these samples are found in the Interim Chemical Analyses (tables 1, 2 and 3) on Sheet 4. To interpret the significance of the analyses, refer to the "Water Quality" section on Sheet 4.



MINISTRY OF THE ENVIRONMENT
Water Resources Branch

COUNTY OF SIMCOE
(Northern Portion)

Map 3126

GROUND-WATER PROBABILITY

SHEET 1

WATER SUPPLIES IN SHALLOW OVERBURDEN
(WITHIN 50 FEET OF SURFACE)